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Case Report

Blunt trauma-induced leiomyosarcoma: A case report

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Abstract
Leiomyosarcoma (LMS) is a rare malignant tumor among soft tissue sarcomas, predominantly occurring in internal organs. Its occurrence in the extremities is even more uncommon. The literature suggests that trauma may contribute to the development of LMS and other soft tissue sarcomas. While there are case reports of trauma-induced LMS, most involve a history of surgical intervention years prior. In this report, we present a case of a 68-year-old female who developed LMS in the extremity within just five months following blunt trauma, along with her clinical course.

Keywords
Soft Tissue Neoplasms, Leiomyosarcoma, Extremities

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Introduction

Soft tissue sarcomas are a rare and heterogeneous group of malignant tumors of mesenchymal origin, accounting for less than 1% of malignancies in adults. The histopathological spectrum of sarcomas is broad, as they can arise from various tissues, including striated skeletal and smooth muscle, adipose and fibrous tissue, bone, and cartilage. While most cases lack a clear etiology, factors predisposing to sarcomas include exposure to radiotherapy or chemotherapy, chemical carcinogens, chronic irritation, and lymphedema.

Leiomyosarcoma, which exhibits pure smooth muscle differentiation, is a relatively rare subtype of soft tissue sarcoma, accounting for approximately 5–10% of all cases [1]. It primarily occurs in the uterus, retroperitoneum, intra-abdominal organs, and vascular walls, although it can also be found in bones and soft tissues of the extremities [2].

Reports of leiomyosarcomas developing after musculoskeletal trauma are scarce in the literature, with most cases having a history of one or multiple surgical interventions or occurring after burns. In this report, we present a case of LMS that developed in the upper extremity five months after blunt trauma.

Case Report

A 68-year-old female patient presented with complaints of pain and swelling in her upper thigh five months after a heavy object fell on the area. Physical examination revealed localized tenderness and mild edema, while other systemic examinations were regular. The patient was initially treated with local and systemic nonsteroidal anti-inflammatory drugs (NSAIDs), but as no improvement was observed, she was referred to the orthopedics department.

Plain radiographs showed no bone pathology, but MRI revealed a mass suspected to be malignant, prompting a biopsy. Histopathological examination confirmed LMS. The patient subsequently underwent surgery, radiotherapy, and chemotherapy. Given that LMS most commonly metastasizes to the lungs, a chest imaging study was performed, which suggested metastases in both lungs, leading to further radiotherapy. The patient has been under follow-up for four years without any signs of recurrence.

Ethical Approval

Since this study is a case report, approval from an ethics committee was not sought. Informed consent was obtained from the patient for the publication of this case report.

Discussion

Severe trauma, particularly in burn cases, has been reported as a rare risk factor for neoplasia development. The average latency period between burn injuries and tumor diagnosis has been reported as 31 years [3].

A 2019 review of a 10-year database from an academic tertiary sarcoma center identified six patients with a history of significant musculoskeletal trauma at the site where sarcoma was later developed. Among them, two had osteosarcoma, two had sclerosing rhabdomyosarcoma, and two had malignant peripheral nerve sheath tumors (MPNST) [4]. Five of these patients had undergone multiple surgeries for their injuries. The mean latency period from trauma to sarcoma development was calculated as 19.8 years (range: 10–30 years). While a history of trauma was a standard feature, four out of five cases also had a history of multiple surgical interventions. In contrast, our case involved only blunt trauma, with no prior surgical history. Furthermore, the reported cases primarily included sarcomas other than LMS.

A 1995 case series described various sarcoma types that developed years after surgical interventions. These patients, aged 46–70, were diagnosed with leiomyosarcoma (two cases), angiosarcoma, sclerosing sarcoma, and pleomorphic sarcoma. The mean latency period from surgery to sarcoma development was 23.6 years (range: 8–40 years) [5]. While our patient's age aligns with the cases reported, the latency period in our case was significantly shorter.

In a 2007 case report, a patient with a history of recurrent nail bed surgery for an ingrown toenail developed an unhealing pyogenic granuloma that persisted for 10 months. A biopsy confirmed LMS, and the patient underwent toe amputation followed by adjuvant chemotherapy [6]. Unlike our case, this patient had a 10-year latency period, yet both cases shared persistent pain and swelling at the trauma site despite treatment.

A 2015 case report described a patient whose forearm was successfully replanted after a traumatic amputation at the distal elbow following a traffic accident. After multiple surgical interventions, a mass developed at the surgical site 24 years later, which was diagnosed as LMS. The patient underwent surgical excision and chemotherapy and remained recurrence-free for three years [7]. Unlike this case, our patient developed LMS within just five months, with no history of multiple surgeries.

Limitation

This case report describes a rare occurrence of leiomyosarcoma developing within a short period after blunt trauma; however, it has several limitations. First, a direct causal relationship between trauma and sarcoma development cannot be definitively established, as the pathophysiology remains unclear. Second, this is a single case report, and more extensive studies are needed to evaluate the potential link between trauma and sarcoma. Third, genetic or molecular analyses were not performed, which could have provided further insights into tumor development. Despite these limitations, this case highlights the need for clinical awareness of soft tissue tumors in patients with persistent post-traumatic symptoms.

Conclusion

As seen in the literature, various sarcomas have been reported following trauma, but most cases involved one or multiple surgical interventions or other substantial etiological factors such as HIV positivity. Additionally, most reported cases exhibited long latency periods before sarcoma development. The distinguishing feature of our case is that the trauma was not surgical but rather due to a heavy object impact, and LMS developed within an exceptionally short period of five months. This case highlights that, although rare, soft tissue tumors such as LMS should be considered in similar cases, particularly in

patients with persistent symptoms despite treatment.

Scientific Responsibility Statement
The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement
All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or compareable ethical standards.

Conflict of interest
The authors declare that there is no conflict of interest.

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